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A STUDY OF THE DEPARTMENT OF RADIOLOGY GENERAL LEONARD
WOOD RMY COMMUNIT (U) ARMY HEALTH CARE STUDIES AND
CLINICAL INVESTIGATION ACTIVITY F. D V WRIGHT

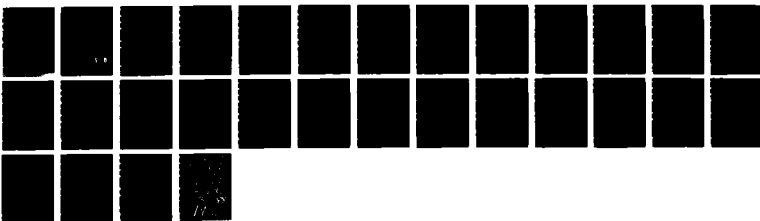
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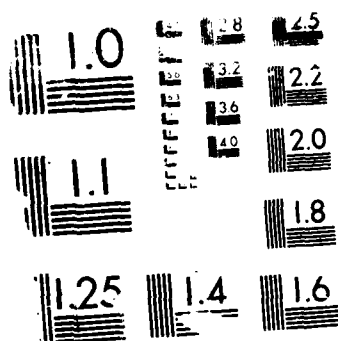
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A STUDY OF THE
DEPARTMENT OF RADIOLOGY
GENERAL LEONARD WOOD ARMY COMMUNITY HOSPITAL
FORT LEONARD WOOD, MISSOURI

AD-A188 471

A Problem Solving Project
Submitted to the Faculty of
Baylor University
In Partial Fulfillment of the
Requirements for the Degree
of
Master of Hospital Administration

By

Captain David V. Wright, MSC

May 27, 1980

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I. INTRODUCTION

Development of the Problem

Historical Information

The General Leonard Wood Army Community Hospital has undergone significant changes in both services and facilities during the past forty years in order to provide medical services to all eligible recipients. The original 1500 bed contonement hospital was replaced in 1965 by a 300 bed modern facility. This basic facility was expanded and upgraded starting in 1974, with the addition of approximately 180 beds and 120,000 square feet of clinic and administrative areas.

In early 1977 the clinic and administrative areas were completed with a resulting relocation of many of the outpatient clinics and ancillary services. The Department of Radiology moved into the new area, allowing it to double in the number of rooms available and add a new ultrasound section. The move also allowed for additional space for the Nuclear Medicine Service. The department did not utilize all four additional rooms until early 1980 when the last room became fully operational.

In July 1977 another change took place in the Department of Radiology when the military radiologists were replaced by contract radiologists. This change eliminated the presence of any military officer personnel from the department and required the Chief, Professional Services to function as the Chief, Department of Radiology.

Conditions Which Prompted the Study

Patient satisfaction has been and continues to be of significant interest throughout the health care industry. The role the patient plays, as a member of the health team, has increased in importance during the past few years. The degree of patient involvement in many aspects of the decision making process in health care has undergone a tremendous expansion. This team aspect and its acceptance as a viable part of medical care is given credence as witnessed by this year's National Hospital Week theme, "We're America's Health Team." Health Services Command (HSC) has indicated its concern relative to patient satisfaction with the requirement for each Medical Center and Medical Department Activity (MEDDAC) to conduct an annual patient satisfaction survey and to report the results of the survey back to them. The results of the survey conducted at General Leonard Wood Army Community Hospital (GLWACH) during Fiscal Year 1979 indicated a lack of patient satisfaction concerning waiting time in the Department of Radiology.

Prior to the negative results on this aspect of the HSC Outpatient Survey, there had been some concern relative to the operation of the Department of Radiology. The Hospital Commander, Executive Officer and Chief, Professional Services were aware of indications of an internal problem or problems which were having a detrimental impact on the efficiency and effectiveness of the department. These perceived problems which appeared to be causing some disorganization within the department had no formal documentation. The results of the survey, which indicated a dissatisfaction with waiting time, coupled with the existing perceptions about the department provided the stimulus to prompt a request by the

Commander for a study of the Department of Radiolgy. The purpose of the study would be to attempt to document the existence of a problem concerning waiting time or to discern whether this dissatisfaction on the part of the patients was a symptom of other problems. The project was approved for study by the hospital Executive Officer.

Statement of the Problem

The problem was to determine the cause of patient dissatisfaction relative to waiting time in the Department of Radiology, General Leonard Wood Army Community Hospital, Fort Leonard Wood, Missouri.

Limitations

The scope of this study was confined to the GLWACH Department of Radiology. The study was further limited in that no additional personnel would be available to be utilized by the Department of Radiology to alleviate the problem or would funds other than those already budgeted for normal operation be available. Another limitation was the nonavailability of specific documentation relative to this problem since it was initiated based on the survey results.

Review of the Literature

The subject of consumer satisfaction is a much discussed subject and numerous surveys have been conceived, conducted and evaluated in an attempt to help determine and fulfill the demands of the consumer. Health care institutions have joined the rest of the major provider organizations in the quest for knowledge relative to user satisfaction. A number of different areas of health and hospital service have been investigated,

but little attention has been given to radiology services.¹ This failure to give consideration to radiology is of particular interest when one considers that the department of radiology occupies a position of great importance in all medical facilities. The use of radiology as both a diagnostic and therapeutic agent has been expanded significantly, resulting in increased patient contact. This increased patient contact has caused more attention to be given to the possible public relations effect generated by the expanded use of radiology as well as other ancillary services.

Most of the articles published on the subject of radiology are concerned with items of personnel management, equipment needs and facility requirements.^{2,3,4} While all of these are relevant issues and directly or indirectly impact on the quality or quantity of services there has been a failure to adequately consider the significance of excessive waiting time as a factor in these studies. In today's environment of increased consumer activity and market competition, this is particularly surprising. The failure to consider all variables in any study tends to invalidate the results of that study. For this reason there exists a need for the consideration of patient satisfaction in health care studies. As the use of corporate marketing techniques infiltrate the health care institutions, this need will no doubt be recognized with a resulting increase in applicable publications.

There exists a requirements for a method of projecting the needs in areas of health care that are subject to random demand.⁵ Areas such as radiology and pathology are subject to peaks and valleys in their demands and this causes problems in computing the requirements to adequately meet these demands while operating as efficiently as possible. Simendinger and

Moore, in their article "A Mathematical Model to Determine Facility Needs for a Radiology Department," present an elaborate model for calculating the physical requirements for a radiology department.⁶ The model comes the closest, of any encountered, to being all encompassing in the inclusion of variables impacting on a radiology department. They aptly include relevant data which when considered in their final equation, allows for a valid projection of facility needs. The use of such a model, with reliable data, does much to eliminate patient dissatisfaction by providing adequate facilities to meet the consumer's demand and reducing the time the patient spends in a nonproductive capacity. To provide for proper personnel staffing other guides/models must be consulted to be used in conjunction with models such as the Simendinger and Moore one.

Texts on Operations Research provide numerous other methods to assist the administrator or planner in evaluating personnel and equipment needs. The use of priority queuing would be a valuable tool in helping determine the needs of ancillary services where there exists a need to fulfill pre-emptive demand.⁷ (Appendix A) Other predictive tools are available and can be of invaluable assistance when used by qualified personnel and reputable consulting firms.

Research Methodology

Organizational data on the Department of Radiology was obtained from the MEDDAC Organization and Function Manual and Department of Radiology Standard Operating Procedures. Numerous on-site visits were made to the department to observe operational activities. These visits were made during various times of the day and were staggered throughout the week.

Information concerning present patient feeling, relative to radiology waiting time, was obtained from members of the Community Health Care Board, patient complaints and the results of the Fiscal Year 1980 Health Services Command Outpatient Survey.

Objectives

The objective of the study was to determine the operational organization of the Department of Radiology, GLWACH and identify those problems which adversely impact on patient waiting time.

Criteria

The data collected was evaluated with an emphasis on identifying items which have a negative effect on patient waiting time. Other criteria involved assuring that any recommendation made be acceptable to the staff, not be detrimental to existing operation and involve no additional costs in either personnel or equipment.

Assumptions

It was assumed that the command element of HSC and this MEDDAC would continue to desire to improve patient satisfaction by reducing patient waiting time in radiology. It was further assumed that workload would remain relatively constant and the supported population mix would be similar to that of the past. Additionally it was assumed that patient dissatisfaction might be related to items other than the length of time spent waiting.

Footnotes

¹P. Ciaron O'Kane and A.D. Gough, "An Evaluation of Patient Demand in a Hospital Radiology Department," Hospital and Health Services Review 74 (July 1978): 226.

²Gregory H. Trovato, "Personnel Management in a Radiology Department," Radiographic Technology 49 (January-February 1978): 475-9.

³William G. Sullivan and Eric L. Blair, "Predicting Workload Requirements for Scheduled Health Care Services, with an Application to Radiology Department," Socioeconomic Planning Sciences 13 (1979): 35-9.

⁴Earl A. Simendinger and Terence F. Moore, "A Mathematical Model to Determine Facility Needs for a Radiology Department," Radiography 44 (May 1978): 116-28.

⁵Sullivan and Blair, "Predicting Workload Requirement for Schedule Health Care Services, with an Application to Radiology Departments," 35.

⁶Simendinger and Moore, "A Mathematical Model to Determine Facility Needs for a Radiology Department." 116-20.

⁷Richard I. Levin and Charles A. Kirkpatrick, Quantitative Approaches to Management (Chicago: McGraw-Hill Book Company, 1978), p. 19.

II. DISCUSSION

Present System

The Department of Radiology, GLWACH, is structurally organized into two services, Diagnostic and Nuclear Medicine. The mission of the department is to provide diagnostic radiological, xeroradiographical and ultrasound services and diagnostic and therapeutic radioisotope services as required in the examination, care and treatment of patients. The department is operational twenty-four hours per day, seven days per week. The radiologists are present during normal duty hours and available for consultation at other times. In addition to the radiologists, the Department of Radiology has an authorized staff of twenty-four employees, consisting of eleven military and thirteen civilians. The majority of the staff are utilized during the normal work week with only minimal coverage provided for evenings, nights, weekends and holidays.

The physical layout for the Department of Radiology is shown in Appendix B. The area provided for the department is of adequate size and allows for good flow. The area occupied by the Nuclear Medicine Section is not included in the floor plan.

The workload for the past eighteen months has remained relatively constant. During Fiscal Year 1979 the department averaged 17,710 exposures per month compared to an average of 17,049 for the first six months of Fiscal Year 1980 (FY80). The decrease is easily attributed to

the inclusion of December in the six months of FY80 and the lack of the increased workload which is normally generated in the summer when basic training is at its peak.

Workload is generated by the inpatient as well as the outpatient sections of the hospital. During the day shift the majority of the requests originate in the various outpatient clinics and on the inpatient floors. The emergency room is the primary source of requests during evenings, nights, weekends and holidays. The Department of Radiology has no control over the number, frequency or type of requests it receives. The only control present is for those special procedures which require extensive time to set up and perform. These special procedures are arranged for on an appointment basis and scheduled by the Department. The amount of control maintained is also affected by the priority of the patient and the needs of the physician. The normal administrative procedures for the processing of requests is shown in the work flow diagram attached at Appendix C.

Problems

The Department of Radiology is a viable, fully functional service in the hospital, but has experienced several problems within the past few years. The problems have been with personnel, facilities and equipment and have all contributed to some degree of loss of efficiency. These are not readily identifiable problems which are easy to document. The effects of these problems are also difficult to delineate, making a study of the department subjective in nature.

The problems which have been identified from on-site visits and conversations with staff personnel are associated with the following:

1. Contractual radiologists
2. Non-commissioned Officer-in-Charge
3. Incomplete facility
4. Maintenance of equipment
5. Personnel dissatisfaction

Contractual Radiologists

The Department of the Army has experienced a great deal of difficulty, since the termination of the draft, in procuring an adequate number of physicians. An area with a particular shortfall was encountered in acquiring enough radiologists for the Army hospitals. In an effort to help alleviate part of the problem many Army hospitals were forced to secure contractual radiologists. In July 1977 contractual radiologists started providing services to the GLWACH. The change from military radiologists to contractual radiologists brought with it a number of other changes and some problems.

The elimination of military radiologists from the department left it without any officer personnel. This elimination of all officers meant the absence of any authority figure and the transfer of the functions previously completed by the Officer-in-Charge (OIC) to other department personnel. One important function which was transferred was the position of Chief, Department of Radiology. This function was given to the Chief, Professional Services. This has caused some interpretation problems with the Joint Commission on the Accreditation of Hospitals (JCAH) requirements that radiology services must be directed by a qualified radiologist.

The presence of contractual personnel who were not government employees also did away with the team concept. The radiologists were not treated and accepted into the "family", thus there was a lack of identification between the radiologists and the rest of the staff. The presence of an "outsider" also brought up the question of loyalty. The fact that they were not part of the team was evident from the working relationship with the other physicians in the hospital. There was a maintaining of a "safe distance" between personnel within the hospital and the radiologists. This separation was evident in social functions as well as on the job. Since the radiologists were not government employees, they could not live in government housing, where almost all of the other hospital physicians reside, adding to the separation problem.

One significant problem was the fact that the contract stipulated two radiologists must be provided, but there was no limitation as to how often the people could be rotated. During the first couple of years of the contract the rotation of radiologists was an ongoing problem. The turmoil it caused within the Department of Radiology affected personnel and ultimately the patient. About the time personnel, within the department, would get accustomed to working with one radiologist he would be moved and another would come in. This also presented problems in credentialing since the radiologist cannot practice medicine without the proper credentials.

Non-Commissioned Officer-in-Charge

The Non-Commissioned Officer-in-Charge (NCOIC) of any department plays a pivotal role in assuring that things get done. When the military radiologists were replaced by contract personnel, the role of the NCOIC became even more important. The NCOIC had to assume some of

the duties previously performed by the officer personnel as well as to continue the task of managing a complex and busy department. Conversations with the staff, indicate that the NCOIC present when the contract radiologists started did not have the ability to adequately fulfill these responsibilities. He was finally replaced by the present NCOIC, who although a good manager, did not have a technical background in radiology. In assuming the new position he inherited a great deal of turmoil and dissatisfaction, left by his predecessor, as well as the task of running the department. By his own admission he felt inadequate in the position, but was willing to give it a good effort. His lack of technical experience presented him with some problems but his previous experience in working with people and his acquired management skills enabled him to progress along smoothly in eliminating most of the existing problems.

Incomplete Facility

The move of the Department of Radiology into the new clinic addition provided for a doubling in the number of procedure rooms. The area previously occupied had only four rooms while the new addition had eight as well as a large area for Nuclear Medicine and an Ultrasound room (Appendix B). The problem encountered was that all eight rooms were not operational until early 1980. The lack of the last two rooms required the other rooms to be used as multi-purpose rooms. The use of a room, for more than one type procedure, often required time to change the equipment setup for the different type of procedure. The performance of any special procedure would end up tying up the room for extended periods of time often causing conflicts in scheduling.

The addition of the seventh and eighth rooms did much to ease the scheduling conflicts and eliminate the requirement to rearrange rooms for different type procedures. The installation of the new equipment in these rooms was also a positive factor since the technology of the new equipment added to the overall efficiency of the department.

Maintenance of Equipment

The rapid increase in technology causes equipment to be outdated and replaced often. The ability of the maintenance personnel to keep informed of the latest changes and be able to apply their training is challenged in today's medical equipment environment. Within the military this problem is multiplied with the presence of equipment from various manufacturers. The requirement to be trained on so many different types of equipment is a limiting factor in the depth of understanding which can be maintained on all types of equipment. The lack of the ability to dedicate maintenance personnel to the Department of Radiology, the presence of different makes of equipment and the geographic location of Fort Leonard Wood, Missouri, are all factors which limit the speed at which equipment is repaired. Although the service provided by the Medical Maintenance Branch is normally prompt, they are, by their own admission, limited in capabilities to repair complex radiographic equipment. If it cannot be done by the hospital medical maintenance personnel, it often means a delay of several days until someone will come in to fix the equipment.

Personnel Dissatisfaction

Personnel dissatisfaction within the Department of Radiology seemed to be related, at least in part, to the problems already presented.

The change to contract radiologist was one of the major contributing factors. The staff did not initially gain a good working relationship with contract personnel. This was in part due to the frequent rotation of the contract radiologists. About the time personnel became familiar with the likes, dislikes and methods of a radiologist, he would leave and be replaced by a new individual with differing methodologies. This scenerio happened so often that department personnel quit putting forth the effort required to function properly, since they felt they would have to start all over as soon as a new individual came in. The instability of radiologists during the start of the contract was of particular significance as a causitive element in staff dissatisfaction.

Another item previously mentioned which had a significant impact on personnel satisfaction was the NCOIC. The previous NCOIC apparently had no desire to deal with personnel problems within the department. Conversations with staff members who are still present, indicated a total lack of interest and abilities on the part of the NCOIC, thus a lack of confidence and commitment on the part of the personnel working in the department. The present NCOIC has done much to correct most of the problems he inherited from his predecessor. His dedication to duty, interest in personnel and managerial abilities have overcome his lack of technical knowledge. His presence has done much to give the department, and in particular the personnel, direction as to what they should be doing to help one another as well as themselves, and ultimately the patient. This direction applied to all personnel in the department, not just the technicians. Personnel within the department who have a significant impact on the patient, relative to attitude and perception of the service, are the receptionists. A patient will often accept a longer

wait than expected or even less than professional care if they are treated nicely. The receptionist can do much to assure the patient's initial impression is favorable and ease the wait by offering an explanation as to the delay. The receptionists in the Department of Radiology have been guilty of failing to keep the patient informed, adding to the patient's problems.

Personnel who are fully qualified in the technical fields also do much to assure patient satisfaction by explaining the procedures, explaining the reason for delays when they occur and completing the procedure in a timely manner. Military technicians often do not have a full grasp of radiographic procedures when they arrive for an assignment. The requirement to provide them with the needed skills may contribute to the slowness of a procedure or the need to repeat a procedure. Unfamiliarity with the differing types of equipment may also reduce efficiency, particularly if the technician changes from one room to another. Fort Leonard Wood purchases its electrical power from a commercial source. The electricity provided is at a plus or minus ten volt fluctuation. If a technician is unfamiliar with this situation, it may cause him to have to repeat some procedures since most of the radiology equipment cannot tolerate that degree of fluctuation in voltage. All these factors may contribute to patient dissatisfaction particularly if they are unaware of the reason for a delay.

In an effort to eliminate some of the friction and misunderstanding which existed in the Department of Radiology, personnel from the Community Mental Health Activity were approached about providing some sort of personnel workshops for the Department of Radiology employees. These team building workshops were held during the evenings to allow maximum

participation. The workshops provided guidance and allowed personnel to openly express their feelings about the system and/or other personnel. As a result of the workshops, some degree of understanding was achieved and some lines of communication opened which seemed to have eased the tension level and aided in working on other problems.

Impact of Problems on the System

Individually, the problems identified could and should have been managed without adversely affecting efficiency or patient satisfaction. Collectively the problems manifested themselves, almost exponentially, until the cumulative result was a detrimental effect on the operation of the Department of Radiology. To the patient who had to wait, for what seemed an excessive amount of time, there was a definite problem relative to waiting time. Had these patients been provided some explanation for the delay there would undoubtedly been less dissatisfaction, even though the problems were still present.

Footnotes

¹U.S. Army, Command Performance Summary, 2D Quarter, FY80, USA MEDDAC, Fort Leonard Wood, Missouri, pp. 5-5, 5-6.

²Joint Commission on Accreditation of Hospitals, Accreditation Manual for Hospitals (Chicago: Joint Commission on Accreditation of Hospitals, 1979), p. 147.

III. CONCLUSION

The cause of patient dissatisfaction relative to waiting time in the Department of Radiology, General Leonard Wood Army Community Hospital, was found to be attributable primarily to the problems as identified in this study. The patients were unaware of these contributing factors and thus perceived waiting time as the problem.

The inconvenience caused by excessive waiting time for radiology patients has effectively been eliminated as a result of the solution, at least in part, of the five problem areas identified by this study. The results of the Fiscal Year 1980 Outpatient Survey indicated a high level of satisfaction relative to radiology waiting time and there has been no recent indication of the problem in either the Community Health Care Board or the Patient Complaint system.

The problems associated with contract radiologists have not been eliminated but the contract is working better. There has been a trend, by the contractor, to stabilize the individual radiologists. This stabilization of personnel has tended to reduce the other problems related to the contract to a manageable level. There are still some problems with having to depend on contracted services but it would be basically the same with any other contract and is thus not peculiar to the radiology contract.

The NCOIC of the department has effectively overcome the shortcomings associated with his lack of technical expertise. The Department of

Radiology is functioning well, due primarily to the management abilities of the NCOIC. Recent conversations with staff members who have been with the department for several years indicate things are now better than ever before.

The completion of rooms seven and eight added to the efficiency of the department by allowing better utilization of technicians, less change-over time and the ability to accomodate more patients. The availability of these rooms with their modern equipment contributed significantly to reducing patient waiting time.

Personnel dissatisfaction among Department of Radiology employees has been reduced appreciably. The personnel management skills possessed by the NCOIC coupled with the team building workshops have enabled lines of communication to be established and aided in establishing a more pleasant working environment.

The problem area in which the least progress has been made is that of medical maintenance. This lack of progress is not due to a lack of interest, but rather due to physical limitations. The Medical Maintenance Branch does not have the resources to provide dedicated service to the Department of Radiology. Breakdown of equipment is now the primary cause of patient delays within the department.

IV. RECOMMENDATIONS

Based upon the conclusion of the study it is recommended that the following actions be taken to improve the operations of the Department of Radiology and thus effectively improve patient satisfaction:

1. The contract for Radiologist Services should be modified to limit the number of radiologists which are rotated through during the contract period. This would effectively reduce turmoil and improve working relationships between the staff and the contract personnel.

2. An officer should be assigned to the Department of Radiology to function as the Officer-in-Charge (OIC). The presence of an authority figure would provide a sense of direction and give the department a higher ranking individual to help in the solution of problems involving other officer personnel within the hospital. This would not solve the problem associated with the JCAH requirements for the Chief, Department of Radiology, but would provide assistance in numerous other areas and relieve the NCOIC of some administrative duties allowing him to concentrate on operational management.

Although this recommendation does violate the criteria of no additional personnel, the need for an officer is considered of primary importance. The projected acquisition of a Radiation Protection Officer may satisfactorily fulfill this need.

3. The NCOIC of the Department of Radiology should be technically competent in the field of radiology as well as possess good management skills. A good manager can, in time, use his skills to effectively run an organization, but if he is technically qualified, as well, it will aid in his overall effectiveness.

4. A position should be dedicated within the Medical Maintenance Branch for a radiology equipment repairman. The amount and complexity of equipment with the Department of Radiology should be sufficient to justify such a position. One individual, with appropriate training, should be effective in providing good preventive maintenance as well as being able to provide repair service on a fast turn-around basis.

APPENDIX A

PRIORITY QUEUING

PRIORITY QUEUING

To assist in determining optimal staffing which would make the best use of personnel and equipment, various forms of Queuing Theory can be used. Queuing Theory studies random arrivals at a servicing or processing facility of limited capacity. Models allow management to calculate lengths of future waiting lines, average time spent in line by a person awaiting service and needed facility additions. This technique can be utilized using various formulas useful in the solution of waiting-line problems and the technique of simulation to generate solutions.

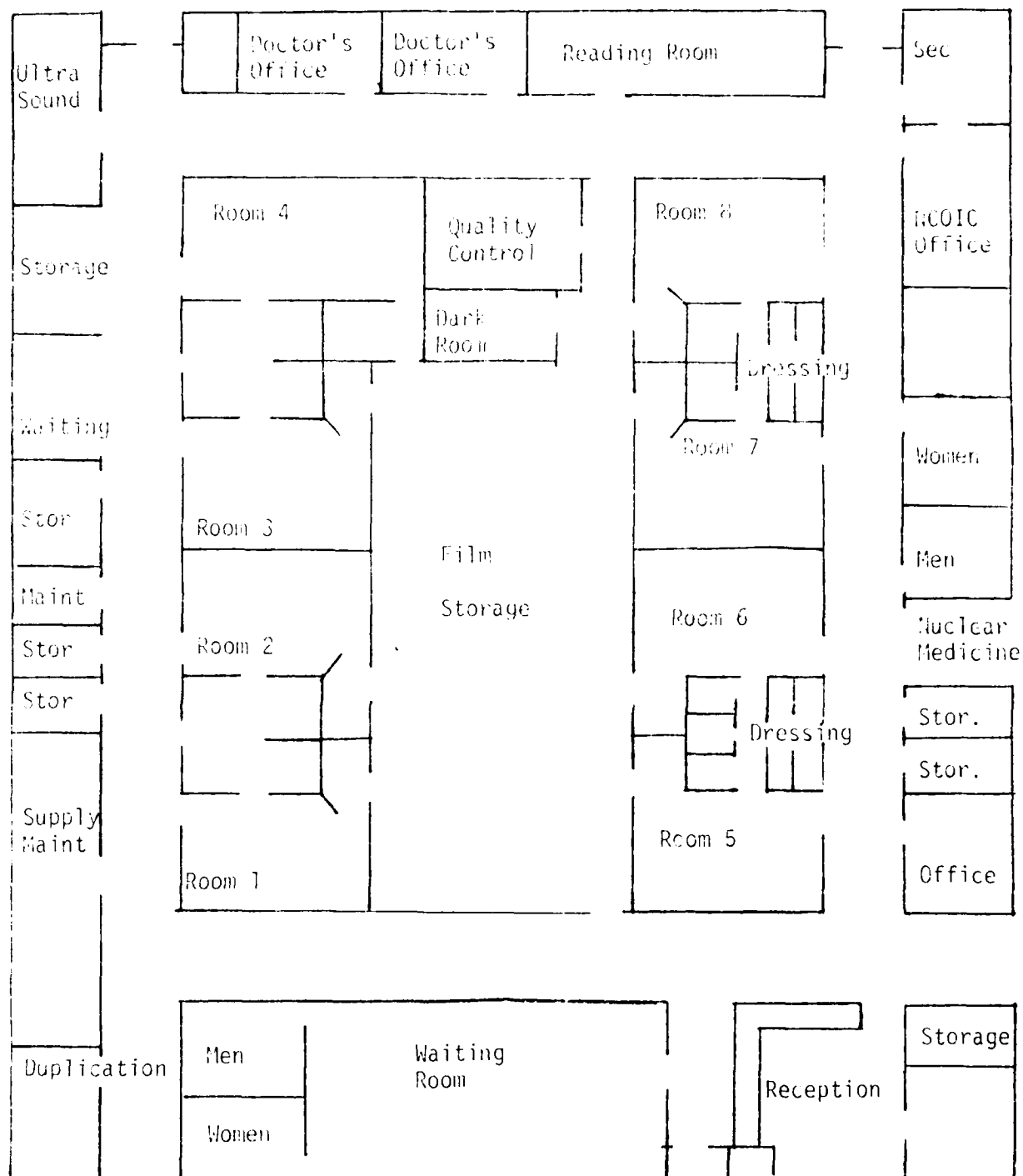
Priority queuing is an adaptation of queuing which allows the introduction of a priority system. There are two varieties of priority queuing, preemptive and nonpreemptive, with nonpreemptive being the most common as well as the one applicable to the radiology environment. Priority queuing works on a first come first serve basis with certain elements having nonpreemptive priority status which allows them to go to the head of the line but not disrupt ongoing operations. Priority elements of the same rank would function on a first come first serve basis.

The utilization of priority queuing would require the services of someone with specialized training or the use of a consulting firm.

Additional information about priority queuing is available in many Operation Research texts.

APPENDIX B

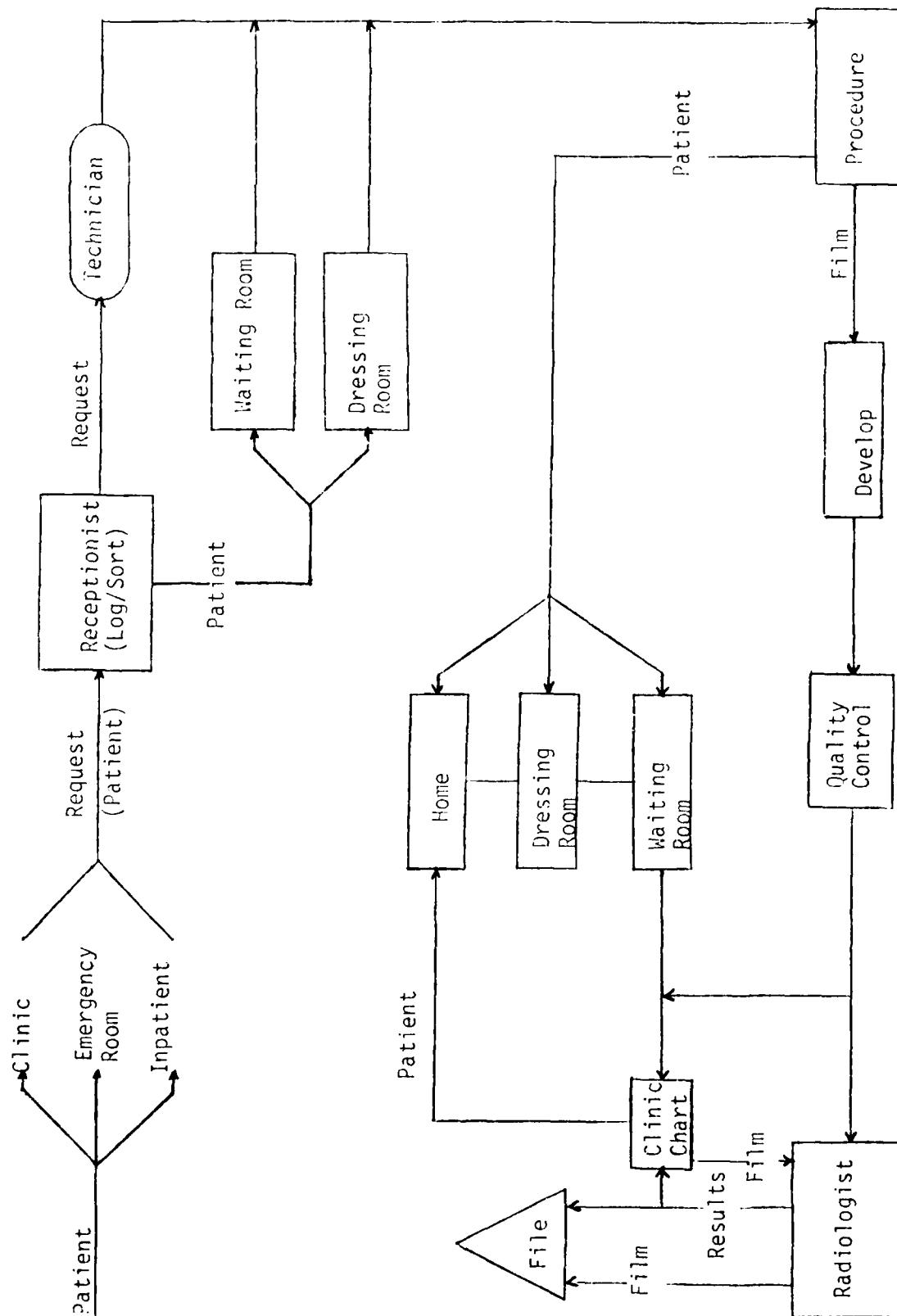
FLOOR PLAN



Floor Plan

APPENDIX C

WORK FLOW



WORK FLOW

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